



(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
30 June 2005 (30.06.2005)

PCT

(10) International Publication Number
WO 2005/059630 A3

(51) **International Patent Classification⁷:** G02B 27/10, G02C 7/02

(21) **International Application Number:** PCT/US2004/042390

(22) **International Filing Date:** 16 December 2004 (16.12.2004)

(25) **Filing Language:** English

(26) **Publication Language:** English

(30) **Priority Data:**
60/530,203 17 December 2003 (17.12.2003) US

(71) **Applicant (for all designated States except US):** THE SCHEPENS EYE RESEARCH INSTITUTE, INC. [US/US]; 20 Staniford Street, Boston, MA 02114 (US).

(72) **Inventor; and**

(75) **Inventor/Applicant (for US only):** PELI, Eliezer [US/US]; 52 Kendall Road, Newton, MA 02459 (US).

(74) **Agents:** HEINE, Holliday, C. et al.; Weingarten, Schurigin, Gagnebin & Lebovici, LLP, Ten Post Office Square, Boston, MA 02109 (US).

(81) **Designated States (unless otherwise indicated, for every kind of national protection available):** AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

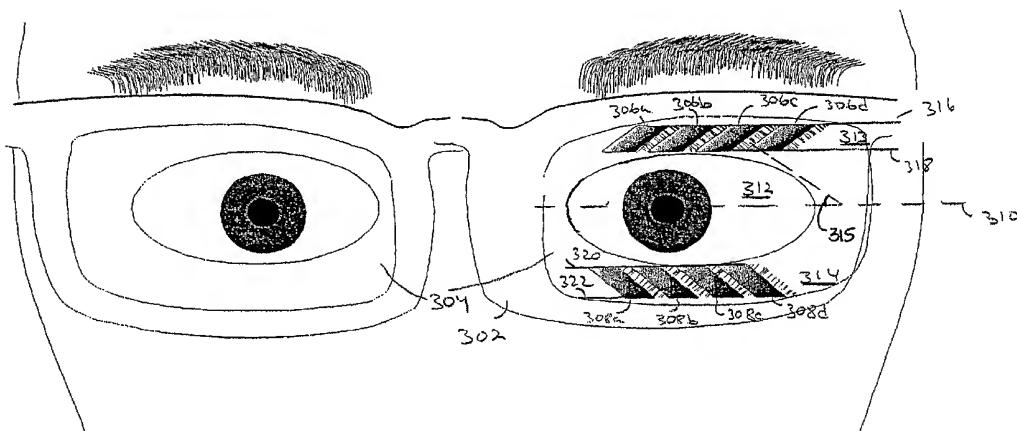
(84) **Designated States (unless otherwise indicated, for every kind of regional protection available):** ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ,

[Continued on next page]

(54) Title: PERIPHERAL FIELD EXPANSION DEVICE



(57) Abstract: A spectacle system is disclosed for shifting the field expansion property of peripheral prisms from the upper and lower peripheral visual fields toward the central visual field of a person with peripheral field loss, and particularly hemianopia, while maintaining the lateral field expansion. In terms of perceived image, the spectacle system includes image-shifting devices that shift the perceived images from the central missing visual fields toward the upper and lower peripheral visual fields. The image-shifting devices are placed out of the central visual field and do not interfere with the normal central or foveal vision of the wearer. The spectacle system can be fitted onto one or both carrier lenses of a pair of spectacles and includes at least one image-shifting device. The image-shifting device includes a plurality of image-shifting elements. In one embodiment, the image-shifting device includes a plurality of image-shifting mirror elements that are arranged to form a Fresnel-like mirrors based prism. In another embodiment, the image-shifting elements can include either a plurality of image shifting mirrors or a plurality of image-shifting prisms that are oriented such that the optical axis of each image-shifting element forms an acute angle with the horizontal visual meridian of the person wearing the spectacles.



CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE,
EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS,
JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA,
MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM,
PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY,
TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA,
ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ,
NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM,
AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT,
BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR,
HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK,
TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
GW, ML, MR, NE, SN, TD, TG)
— as to the applicant's entitlement to claim the priority of the
earlier application (Rule 4.17(iii)) for all designations

— of inventorship (Rule 4.17(iv)) for US only

Published:

- with international search report
- with amended claims

(88) Date of publication of the international search report:
17 November 2005

Date of publication of the amended claims: 29 December 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.